Simplifying Radicals

Agenda

Warm-Up
HW Check
Notes p.96
HW #1-11

Reminders

Quiz TMR!

Essential Question

How do I simplify a square root?

Warm-Up Thursday

Find all of the solutions to the following quadratic equations.

FACTOR

1. $2x^2 + x = 3$

$-3 \quad -3$

$2x^2+x-3=0$

$a:2 \quad b:1 \quad c:-3$

	x	-1
$2x$	$2x^2$	$-2x$
$+3$	$3x$	-3

-6

$-1 \mid 6$

$1 \mid -6$

$2 \mid -3$

$-2 \mid 3$

↑ Add to 1

$(x-1)(2x+3)=0$

$x-1=0$

$+1 \quad +1$

$x=1$

$2x+3=0$

$-3 \quad -3$

$\frac{2x}{2} = \frac{-3}{2}$

$x=-3/2$

$\{-3/2, 1\}$

SQUARE ROOT

2. $-5(x+2)^2 = -405$

$-5 \quad -5$

$\sqrt{(x+2)^2} = \sqrt{81}$

$x+2 = \pm 9$

$-2 \quad -2$

$x = 9-2$ or $x = -9-2$

$x = 7$ $\quad x = -11$

$\{-11, 7\}$

questions comments concerns?

Algebra I – Unit 8 – Solving Quadratics by Using Square Roots

Practice - Solving Quadratics by Using Square Roots

Name _____ Date _____ Period _____

"What do you call a funny book about eggs?"

1. $x^2 = 81$
2. $4x^2 - 18 = -9$
3. $2x^2 + 7 = 207$
4. $5 - x^2 = 20$
5. $16x^2 + 10 = 131$
6. $81x^2 + 17 = 81$
7. $x^2 - 29 = 0$
8. $-3x^2 + 200 = 8$

L. $x = \pm\frac{2}{3}$

B. $x = \pm\sqrt{29}$

O. $x = \pm\frac{11}{4}$

K. No real solution

Y. $x = \pm 8$

E. $x = \pm\frac{8}{9}$

K. $x = \pm 9$

A. $x = \pm\frac{3}{2}$

S. $x = \pm\frac{4}{11}$

O. $x = \pm 10$

R. $x = 100$

2	8	5	1	6	7	5	3	4
						O		K

Algebra I – Unit 8 – Solving Quadratics by Using Square Roots

Solve using square roots.

9. $5(x-1)^2 = 180$

10. $16(x+5)^2 = 1024$

11. Carter plans to wallpaper the longest rectangular wall in his living room. The wall is twice as long as it is high and has an area of 162 square feet. What is the height of the wall?

12. The height of a triangle is twice the length of its base. The area of the triangle is 50 square meters. Find the height and base to the nearest tenth of a meter.

13. Fenway Park is a Major League Baseball park in Boston, Massachusetts. The park offers seats on top of the left field wall. A person sitting in one of these seats accidentally drops his sunglasses on the field. The height, h (in feet), of the sunglasses can be modeled by the function $h = -16t^2 + 38$ where t is the time (in seconds) since the sunglasses were dropped. Find the time it takes for the sunglasses to reach the field. Round your answer to the nearest hundredth of a second.

Simplifying Radicals

Essential Question How do I simplify a square root?

Radical Sign - square root sign $\sqrt{}$

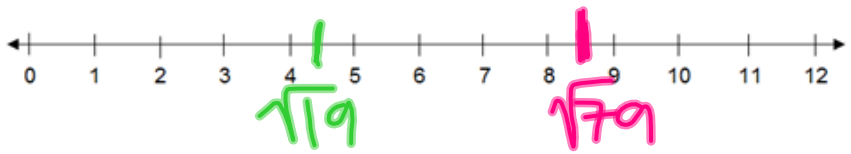
Radicand – the expression under the $\sqrt{}$

What are the perfect squares for numbers 1- 10?
Fill out the table below.

Number	Perfect Square
1^2	1
2^2	4
3^2	9
4^2	16
5^2	25
6^2	36
7^2	49
8^2	64
9^2	81
10^2	100

Square Root $\leftrightarrow$ Square

Example 1: Use the table above to place $\sqrt{19}$ and $\sqrt{79}$ in the correct location on their number line.



Simplifying Radicals

Essential Question How do I simplify a square root?

PROPERTIES OF RADICALS

$$\sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}}$$

$$\sqrt{ab} = \sqrt{a} \cdot \sqrt{b}$$

$$\left(\sqrt{a}\right)^2 = a$$

$\sqrt{x^2} = \sqrt{81}$

x

Simplifying Radicals

Essential Question How do I simplify a square root?

Example 2: $\sqrt{\frac{3}{49}} = \frac{\sqrt{3}}{\sqrt{49}} = \boxed{\frac{\sqrt{3}}{7}}$

Example 3: $\sqrt{\frac{5}{36}} = \frac{\sqrt{5}}{\sqrt{36}} = \boxed{\frac{\sqrt{5}}{6}}$

Simplifying Radicals

Essential Question How do I simplify a square root?

Y= #/x

Example 4: $\sqrt{75}$

75
1 | 75
3 | 25
5 | 15

$\sqrt{3 \cdot 25}$
$\sqrt{3} \cdot \sqrt{25}$
$\sqrt{3} \cdot 5$
$5\sqrt{3}$

NORMAL FLOAT AUTO REAL DEGREE MP
PRESS + FOR ΔTbl

X	Y1
0	ERROR
1	75
2	37.5
3	25
4	18.75
5	15
6	12.5
7	10.714
8	9.375
9	8.3333
10	7.5

X=0

Example 5: $\sqrt{98}$

98
1 | 98
2 | 49
7 | 14

$\sqrt{2 \cdot 49}$
$\sqrt{2} \cdot \sqrt{49}$
$7\sqrt{2}$

NORMAL FLOAT AUTO REAL DEGREE MP
PRESS + FOR ΔTbl

X	Y1
0	ERROR
1	98
2	49
3	32.667
4	24.5
5	19.6
6	16.333
7	14
8	12.25
9	10.889
10	9.8

X=0

Simplifying Radicals

Essential Question How do I simplify a square root?

Example 6: $\sqrt{180}$

Example 7: $\sqrt{18}$

Simplifying Radicals

Essential Question How do I simplify a square root?

Example 8: $6\sqrt{48}$

6

48

1	48
2	24
3	16
4	12
6	8

$6\sqrt{3 \cdot 16}$

$6\sqrt{3} \cdot \sqrt{16}$

$6 \cdot 4\sqrt{3}$

$24\sqrt{3}$

Example 9: $2\sqrt{32}$

NORMAL FLOAT AUTO REAL DEGREE MP
PRESS + FOR △Tbl

X	Y1
0	ERROR
1	48
2	24
3	16
4	12
5	9.6
6	8
7	6.8571
8	6
9	5.3333
10	4.8

X=0

Simplifying Radicals

Essential Question How do I simplify a square root?

Example 10: $\left(3\sqrt{6}\right)^2$

$(3\sqrt{6})(3\sqrt{6})$

$3^2(\sqrt{6})^2$

$9 \cdot 6$

$\boxed{54}$

Example 11: $\left(4\sqrt{5}\right)^2$

simplifying radicals

Essential Question How do I simplify a square root?

STEPS TO SIMPLIFY RADICALS

Algebra 1: Unit 8 – Simplifying Radicals

Practice – Simplifying Radicals

Name _____ Date _____ Period _____

What is usually waiting for you at Starbucks?

Directions: Simplify each of the following completely. Show all work to receive full credit ☺

1. $\sqrt{\frac{8}{49}}$

(W) $\sqrt{\frac{8}{7}}$ **(S)** $\frac{2\sqrt{2}}{7}$

2. $\sqrt{\frac{10}{18}}$

(P) Not here **(R)** $\frac{\sqrt{5}}{3}$

3. $\sqrt{294}$

(N) $7\sqrt{6}$ **(U)** $6\sqrt{7}$

4. $\sqrt{108}$

(T) $6\sqrt{3}$ **(O)** $2\sqrt{27}$

5. $\sqrt{525}$

(F) Not here **(A)** $5\sqrt{21}$

6. $3\sqrt{8}$

(L) $6\sqrt{2}$ **(N)** $12\sqrt{2}$

7. $4\sqrt{90}$

(W) $36\sqrt{10}$ **(H)** $12\sqrt{10}$

8. $2\sqrt{45}$

(J) $18\sqrt{5}$ **(I)** $6\sqrt{5}$

9. $\sqrt{25}$

(E) 5 **(B)** 25

10. $\sqrt{300}$

11. $\left(11\sqrt{2}\right)^2$

12. Mario is building a fence around his garden so Yoshi doesn't escape. If the length is $\sqrt{40}$ and the width is $2\sqrt{10}$, find the perimeter of the garden in simplest radical form.

4	7	9	2	9	8	1	5	6	8	3	9

HW Help: Simplifying Radicals

NO work = NO credit = NO Kidding!

1. $\sqrt{\frac{8}{49}} = \frac{\sqrt{8}}{\sqrt{49}} = \frac{\sqrt{4\cdot 2}}{\sqrt{49}} = \frac{\sqrt{4}\cdot\sqrt{2}}{7} = \boxed{\frac{2\sqrt{2}}{7}}$

2. $\sqrt{\frac{10\div 2}{18\div 2}} = \sqrt{\frac{5}{9}} = \frac{\sqrt{5}}{\sqrt{9}} = \boxed{\frac{\sqrt{5}}{3}}$

3. $\sqrt{294} = \sqrt{49\cdot 6} = \sqrt{49}\cdot\sqrt{6} = \boxed{7\sqrt{6}}$

4. You try!

5. You try!

6. $3\sqrt{8} = 3\sqrt{4\cdot 2} = 3\sqrt{4}\cdot\sqrt{2} = 3\cdot 2\sqrt{2} = \boxed{6\sqrt{2}}$

7. You try!

8. You try!

9. You try!

10. You try!

11. $(11\sqrt{2})^2 = (11\sqrt{2})(11\sqrt{2}) = 121\sqrt{2}\cdot\sqrt{2} = \boxed{242}$

12. OMIT

Answers:
1. S
2. R
3. N
4. T
5. A
6. L
7. H
8. I
9. E
10. $10\sqrt{3}$
11. 242
12. $8\sqrt{10}$